



# CR Stochastic Cooling Status

Chuan Zhang

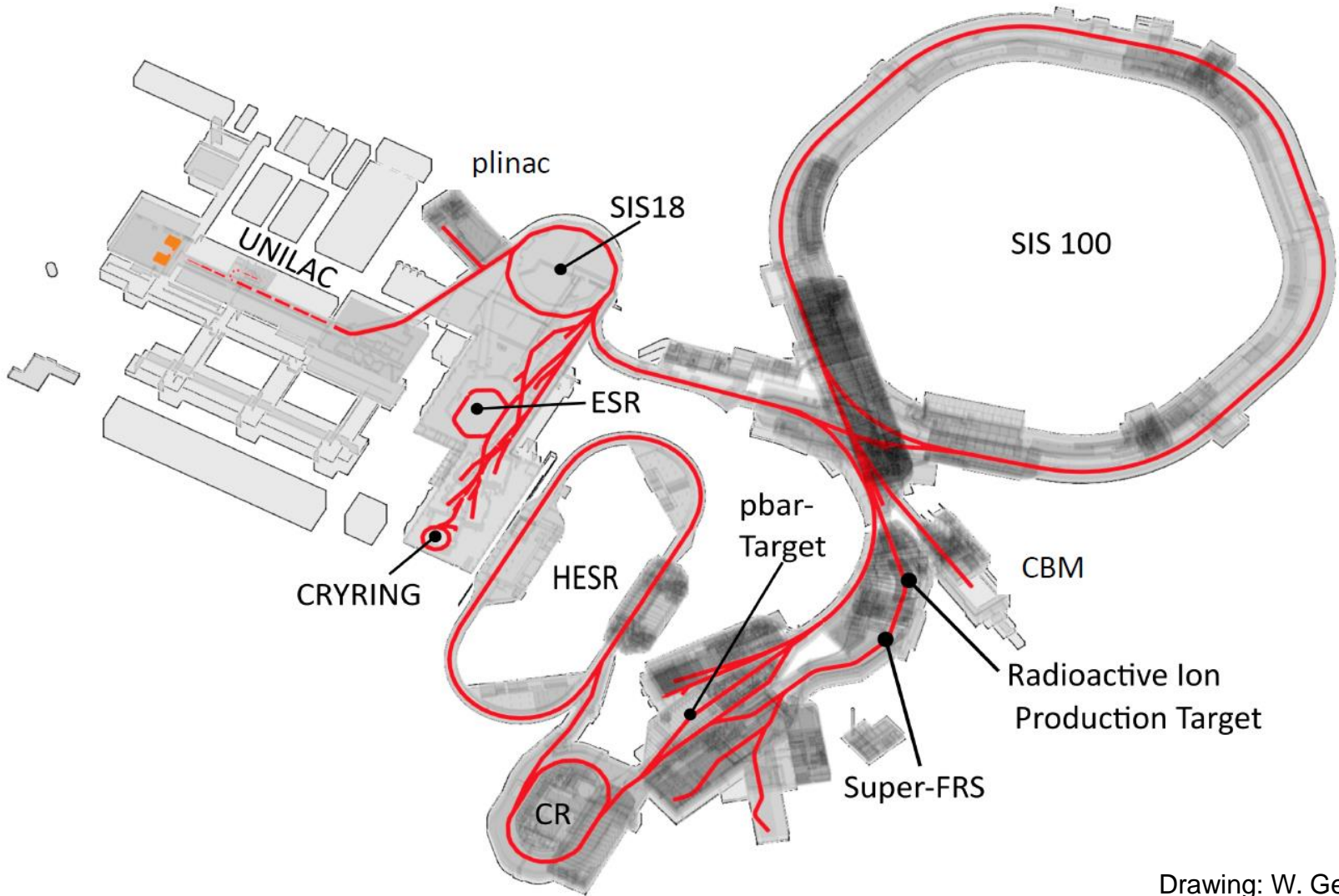
on behalf of the CR SC team

- C. Dimopoulos
- A. Bardonne
- R. Böhm
- M. Bräscher
- O. Gorda
- R. Hettrich
- J. Krieg
- C. Peschke
- A. Stuhl
- S. Wunderlich
- C. Zhang



- **Brief Overview**
  - FAIR & Collector Ring
  - CR Stochastic Cooling System
  
- **Recent Highlights**
  - Cryo-Test for Slotline PU
  - Palmer PU
  - Optimization of Signal Path from Palmer PU to Kicker
  - Power Amplifiers

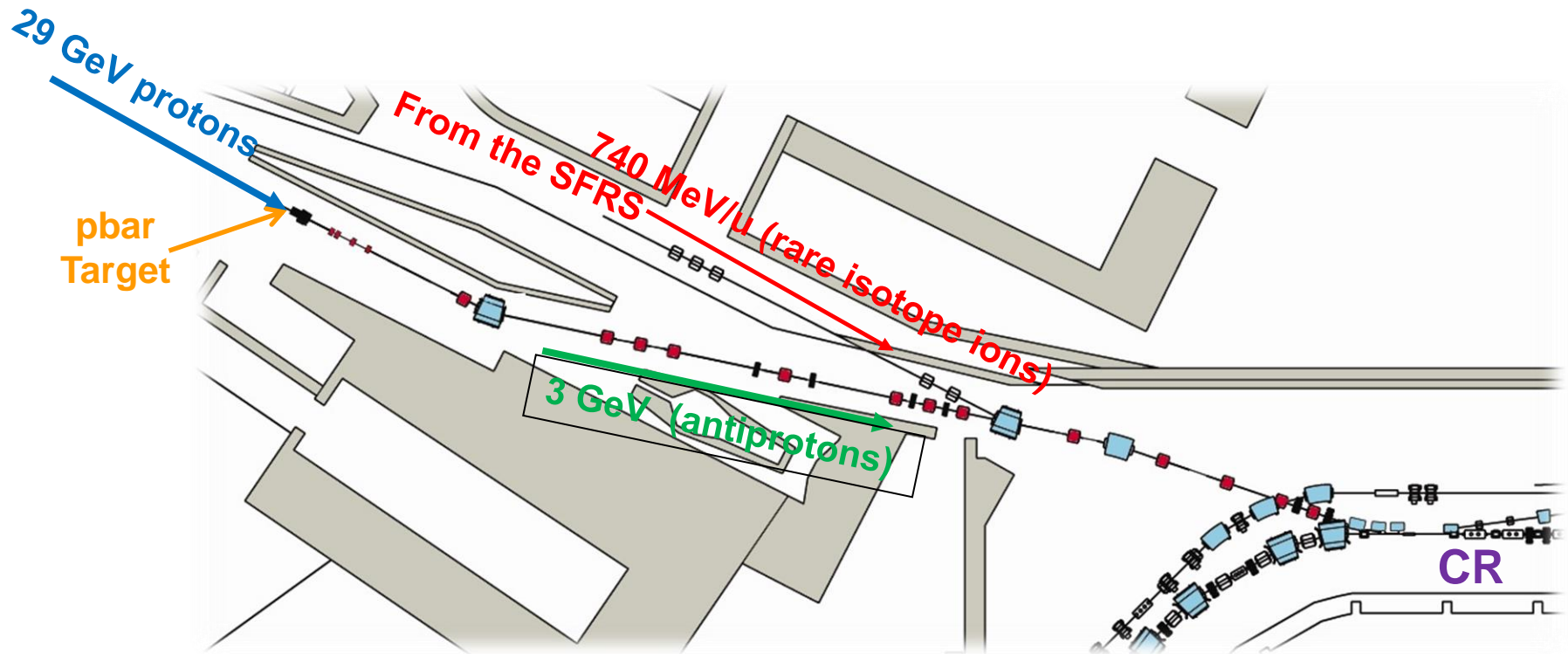
# Overview of FAIR

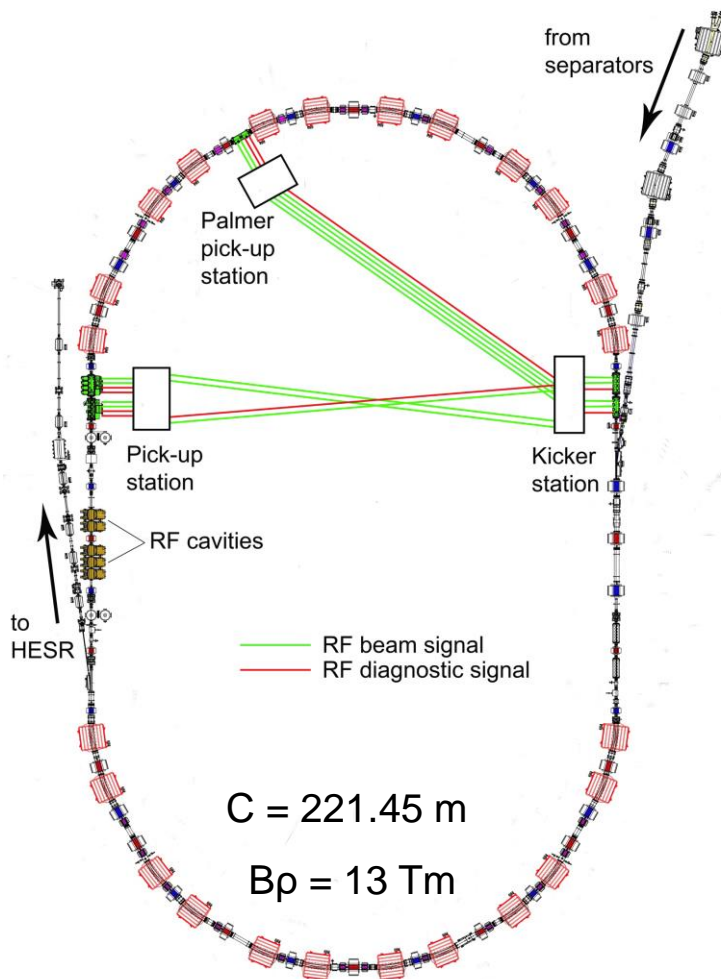


Drawing: W. Geithner

# Tasks of CR

Efficient collection & fast stochastic cooling of hot secondary beams (antiprotons & rare isotopes) coming from production targets. Possible: 740 MeV/u stable ions from SIS18.

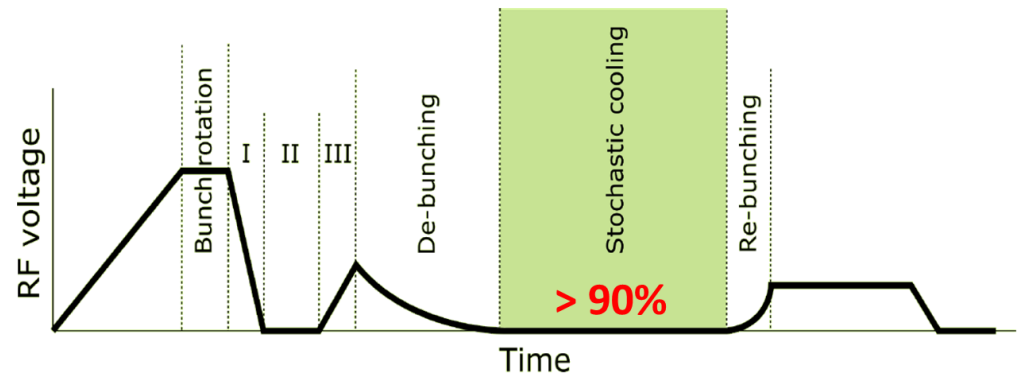




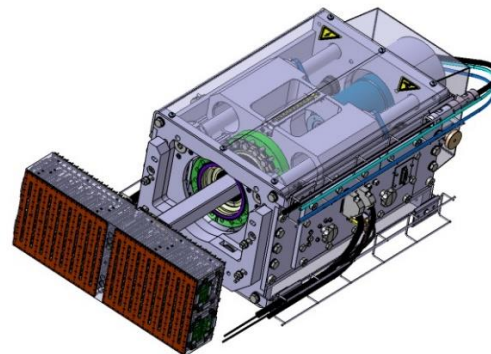
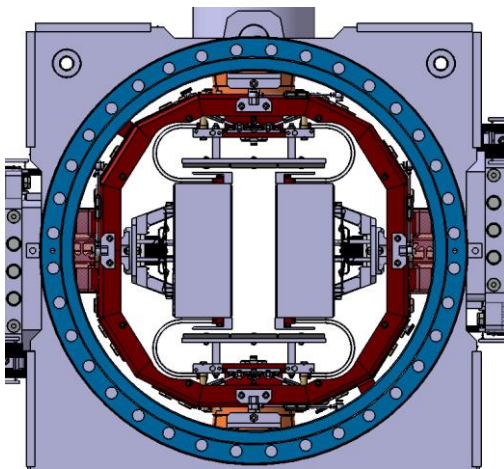
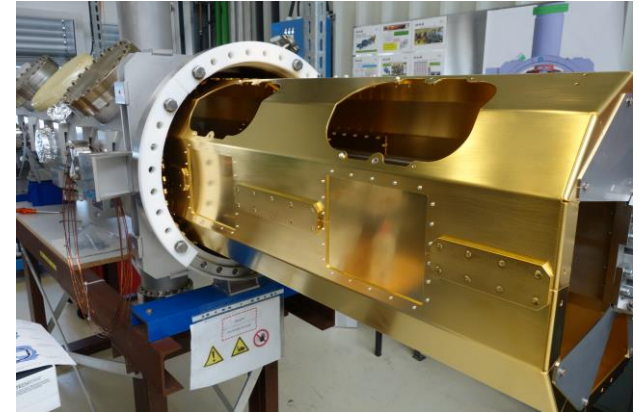
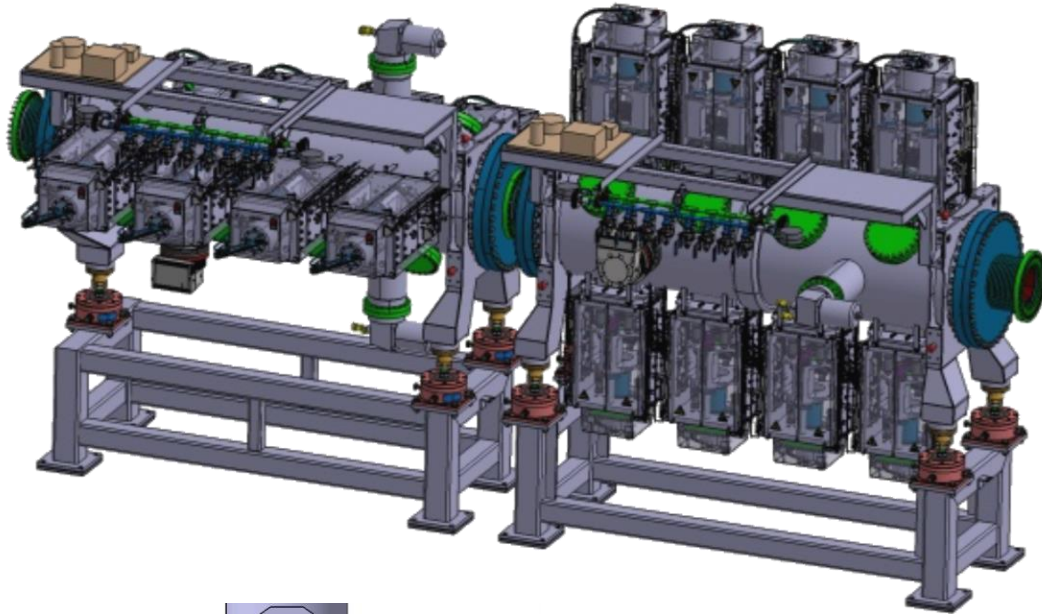
## 3D stochastic cooling of coasting secondary beams (max. $10^8$ ions)

Slot-line pick-ups with movable (plunging) electrode modules at cryogenic temperature ( $\sim 30 \text{ K}$ ).

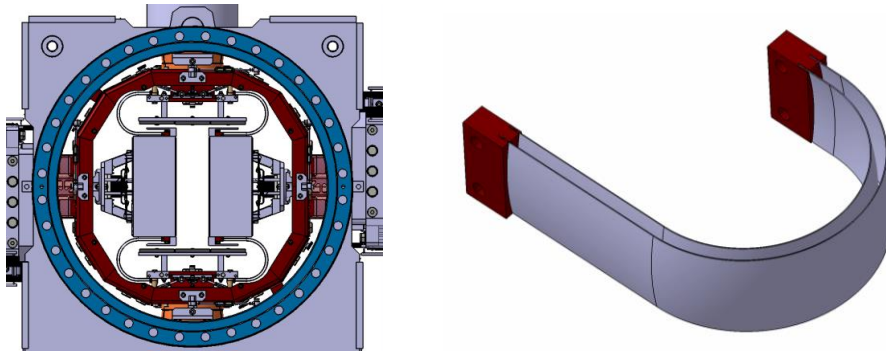
Palmer pick-up for pre-cooling of hot radioactive ion beams.



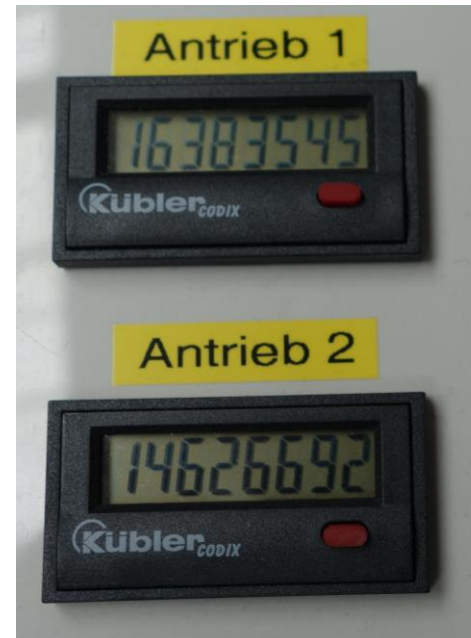
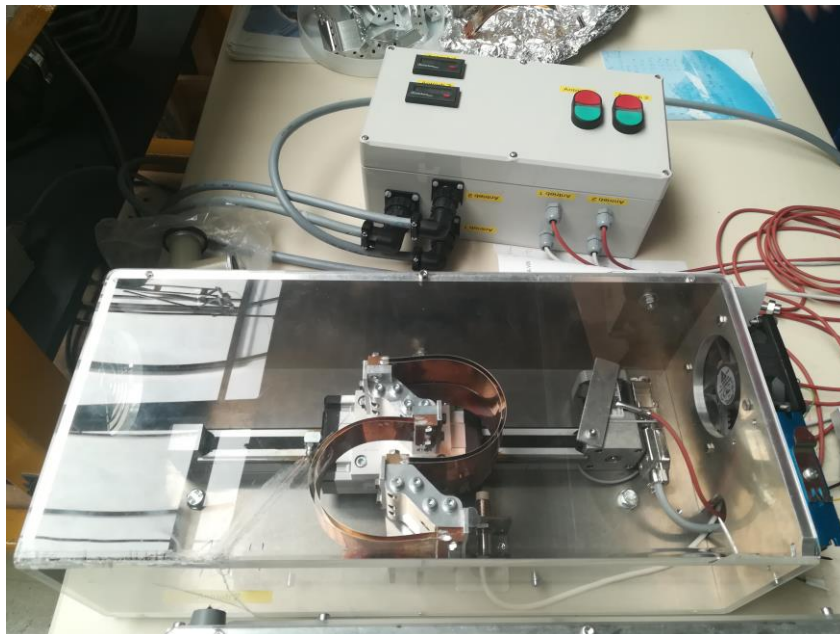
# Slotline PU (Cryogenic, Plunging) FAIR



# Test for Plunging Foils



- Copper beryllium (CuBe)
- Silver coated
- Design lifetime: 10 million cycles



A. Stuhl  
A. Bardonner  
M. Bräscher



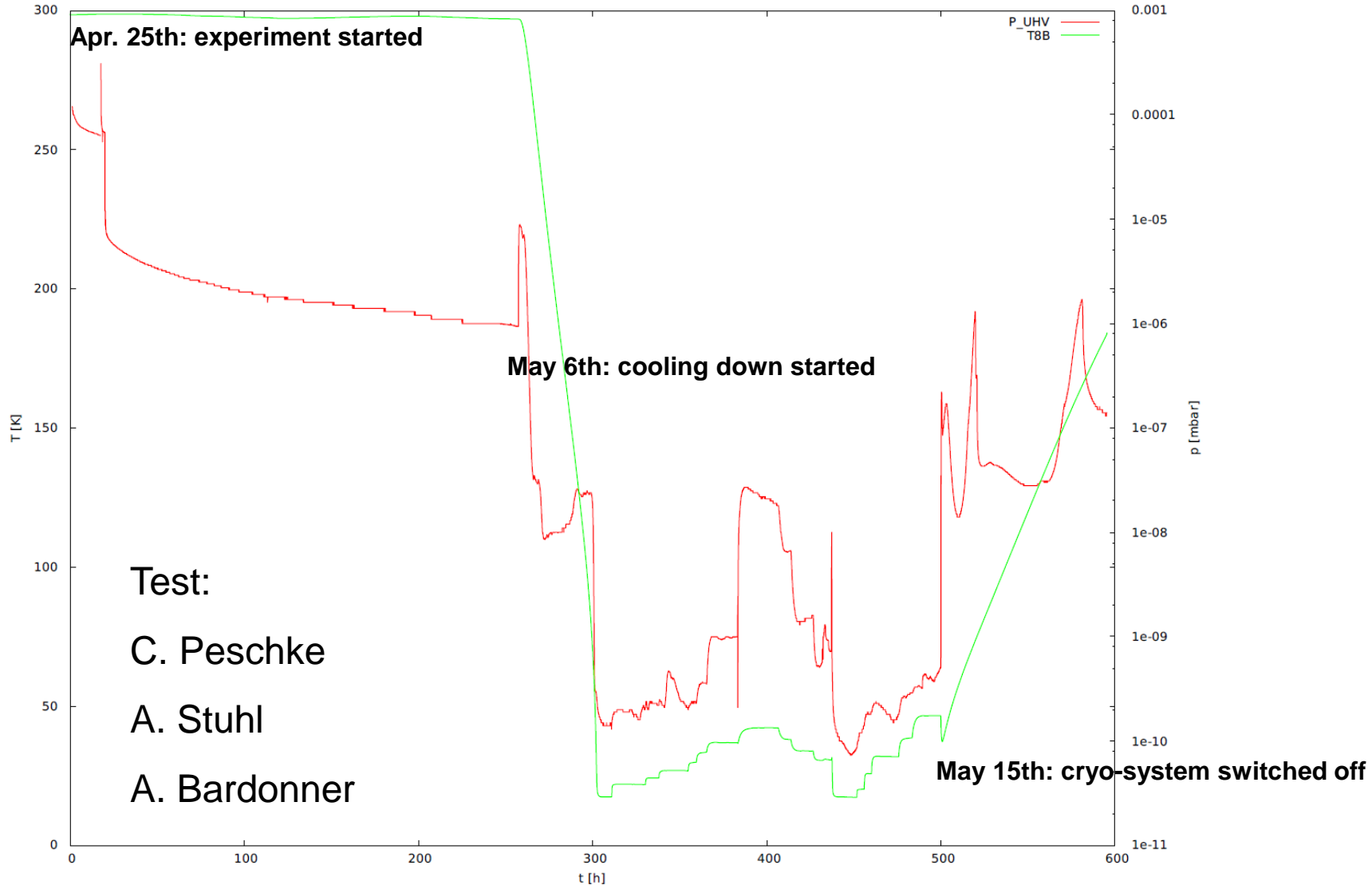


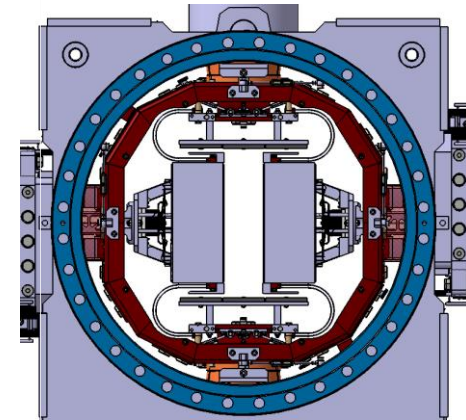
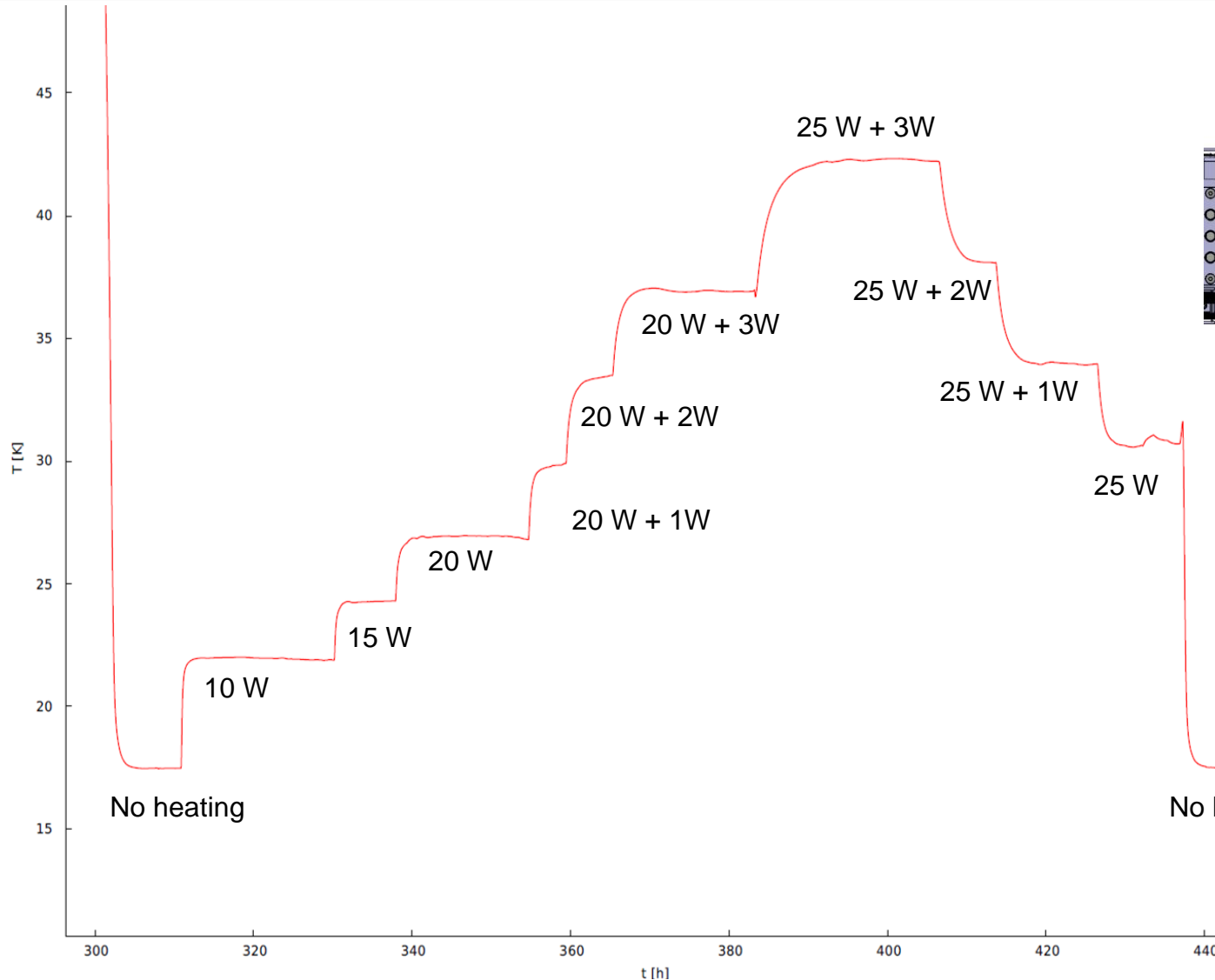
# Cryo-Test for Slotline PU



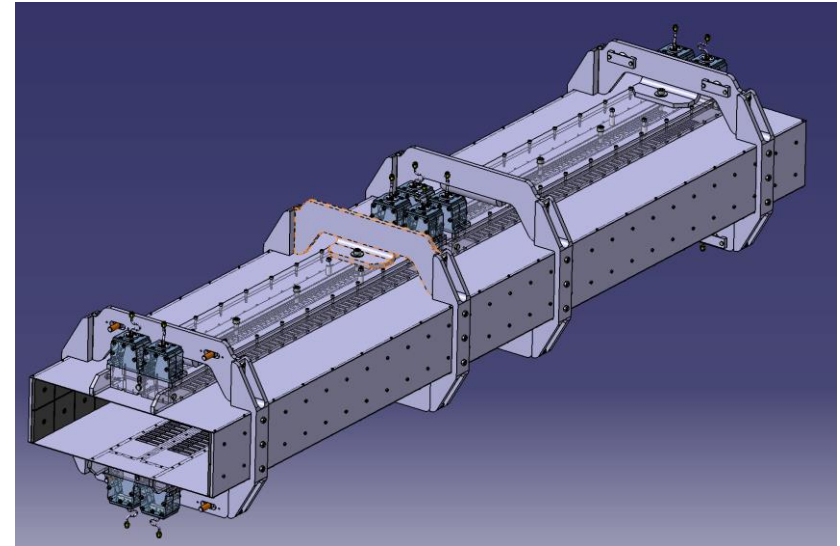
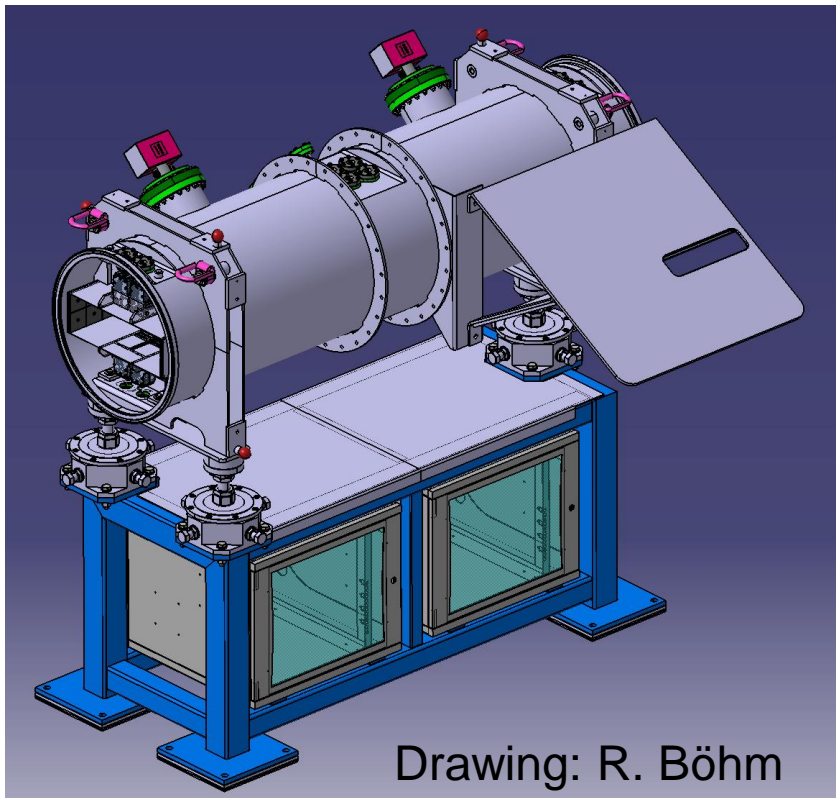
Installation:  
M. Bräscher  
J. Krieg

# Cryo-Test (ongoing...)





Test:  
 C. Peschke  
 A. Stuhl  
 A. Bardonner



Design: done

Tank: ordered

Inner-structure:

- Final optimization: ongoing
- Production will be started soon
- Will be sent to FZJ for beam test at COSY in 2020

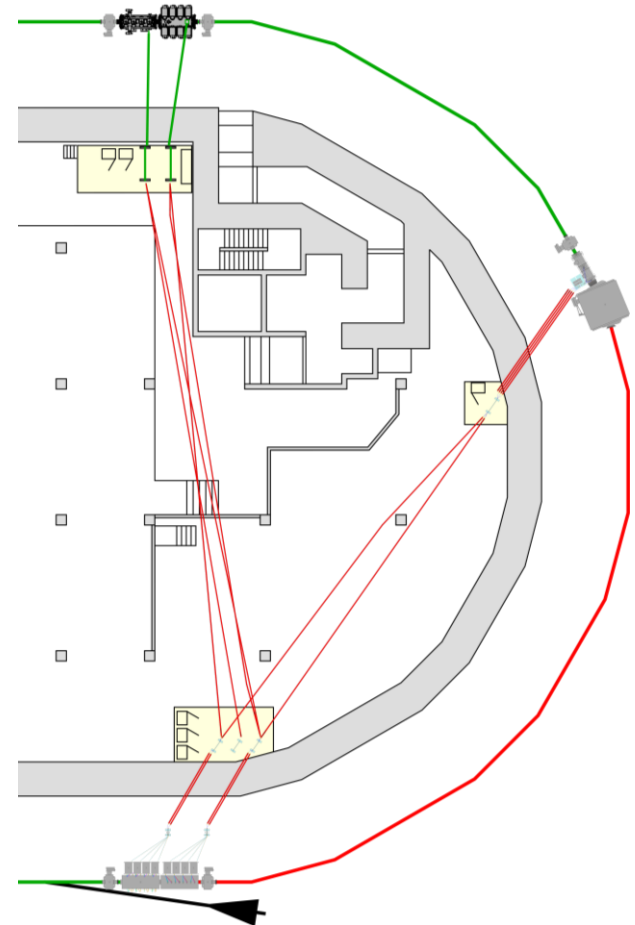
- Had no reserve for signal path time with respect to the ion beam flight time from Palmer pick-up to kickers.
- New solutions e.g. changing the position/angle of the holes for the signal path in the inner building wall.
- Building change request has been accepted.

**H: +7.6ns**

**V: +5.8ns**

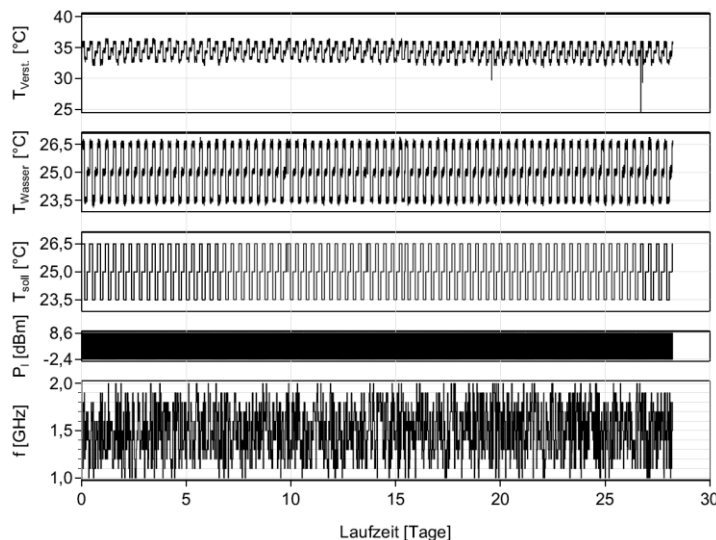
Optimization:

C. Peschke





- Procurement contract in 2014.
- Improved FoS with re-designed RF-module for fulfilling specifications (SAT: Q4/2017).
- Improved FoS with re-designed RF-combiner for reliability issue (FAT: Q2/2018).
- Successful long-time SAT of FoS (Q3/2018).
- Series production launched in Q1/2019.



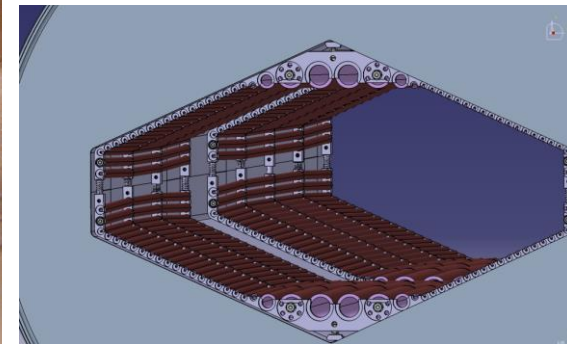
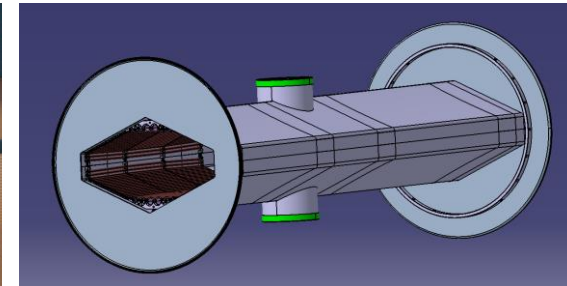
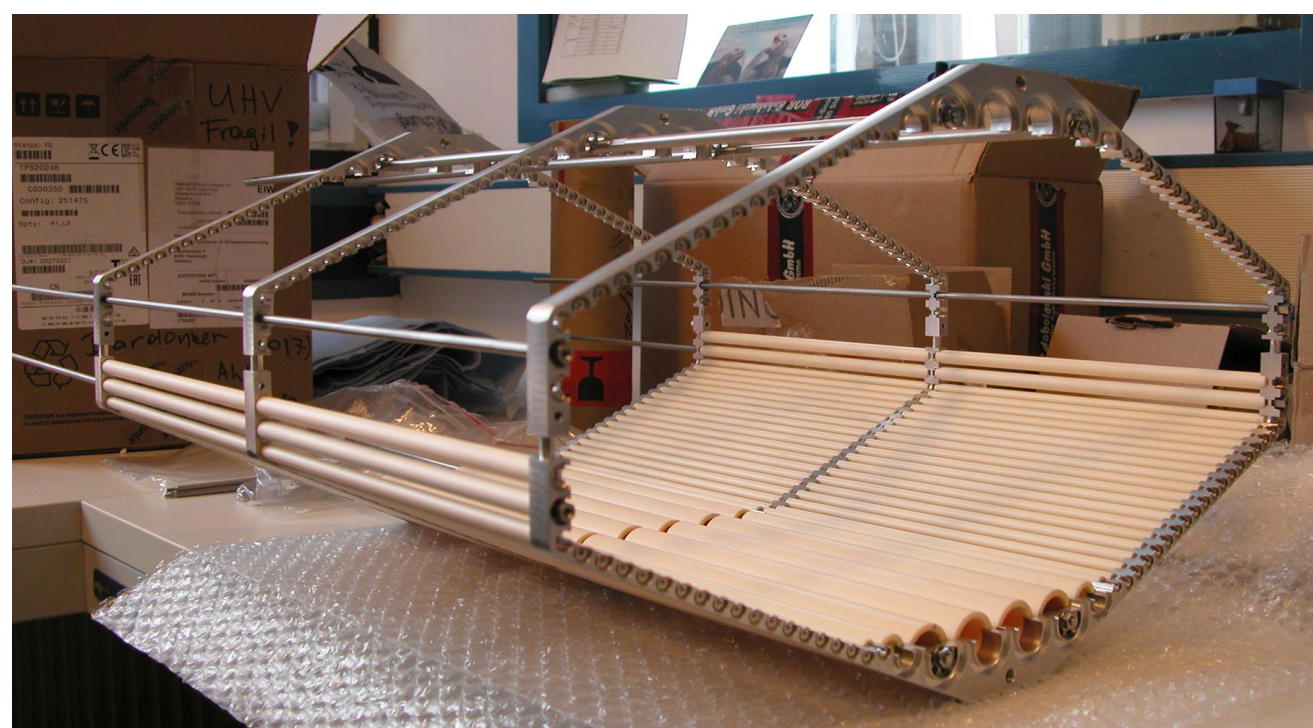
4-Week SAT

SAT:

C. Peschke

S. Wunderlich

# Microwave Damping Tubes



**Resistively coated ceramic tube modules inside all hexagonal quadrupole/sextupole vacuum chambers in the CR arcs**

C. Dimopoulou  
A. Bardonner  
C. Peschke

**Vielen Dank für Ihre Aufmerksamkeit!**

**Спасібо!**

**Thank you for your attention!**

